CUBIT Capability Proposal

Technical Area Geometry, Meshing, Infrastructure, GUI, Graphics, etc..	**Technical Lead** Cubit Developer in charge of technical area
Geometry	Brett Clark

MRD Description

Describe the capability in terms of how a user would see it.

Create NURBS surfaces from mesh based geometry so that modeling operations can be robustly completed using geometry kernels.

SRS Description

What needs to be done by Cubit developers to implement this capability? Break the tasks into steps if applicable. (Steps should be on the order of 2 man-weeks or more)

1. Evaluate literature on point cloud to NURBS. 2. Develop algorithms to determine simple analytic surfaces from point clouds (plane, cylinder, maybe torus.) 3. Develop general NURBS fitting algorithms. 4. Modify import mesh geometry to utilize the new algorithms and create volumes from sets of bounding surfaces.

Justification

Describe why this is important and what impact it will have if it is implemented. (or not implemented).

The Cu bit project has spent a great deal of time and effort in making facet based geometry functional and robust. To this point, the success of this effort has been somewhat limited. Much of the problem is related to very difficult tolerance issues that arise from splitting facets and the propagation of sliver facets through the process. It is time to consider other avenues of research that could be more fruitful. This is also a research topic although there are a number successful commercial applications of this technology. I believe that this approach has a higher probability of success for handling mesh based geometry than the facet based approach.

Resources Who will work on this	**Time estimate** How much time will it take in man-weeks	**Targeted Release** 10.2 (August 06), 10.3 (March 2007), 10.4 (August 2007), Future (beyond FY07)
Karl M., Mike Brewer?, others?	10 man months + (less than we have spent on mesh based geometry to date)	Future

Submitted By:	**Date:**
Karl Merkley	17-March-2006